



**STATE COOPERATIVE FINAL AGENCY DECISION STATEMENT**  
**Kansas Department of Health and Environment**  
**Bureau of Environmental Remediation**

**SITE NAME:** Eagle Picher Smelter Site (C3-011-72090)

**CITY/COUNTY:** Galena, Cherokee County

**DATE:** September 2012

**MEDIA IMPACTED:** Soil, sediment, surface water

**LAND USE (Current):** Commercial

**SITE BACKGROUND:**

The Eagle Picher Smelter Site is located in the northeast corner of Galena, Cherokee County, Kansas, as shown on Figure 1. The facility, in operation from 1878 to 2004, processed lead, zinc, and cadmium ores. Other activities included the production of zinc oxide, zinc sulfate, manganese sulfate, and manganese dioxide as well as the operation of a sulfuric acid plant. In April 2005, EaglePicher Holdings, Inc. declared bankruptcy under Chapter 11 of Title 11 of the United States Code. A subsequent Kansas Settlement Agreement established a trust fund for the remediation of contamination at the 68-acre site. After this settlement was negotiated, ownership of additional undeveloped outparcels was disclosed by EaglePicher Holdings, Inc., bringing the total to 148 acres. The site is currently being addressed under the bankruptcy settlement between Eagle Picher Custodial Trust, the Kansas Department of Health and Environment (KDHE), and the Environmental Protection Agency (EPA). KDHE is the lead agency for environmental issues at the site.

Soil, sediment, and surface water contamination were identified in 2006 during an investigation conducted by KDHE. The Eagle Picher Trust conducted an Extent of Contamination Investigation in 2007 to determine the extent of contamination in the smelter plant area and outparcels, as well as in sediments and surface water of Short Creek. Lead, cadmium, arsenic and mercury were identified in surface and subsurface soils at concentrations above respective KDHE's Tier 2 Levels for the Soil Pathway for non-residential use as specified in KDHE's Risk-Based Standards for Kansas (RSK) Manual, and arsenic, cadmium, chromium, lead, mercury and zinc were identified in sediment above the Probable Effect Concentrations (PECs) in Short Creek. Cadmium, lead and zinc in surface water in Short Creek exceeded acute and chronic Aquatic Life Water Quality Criteria (ALWQC) standards.

In accordance with the Settlement Agreement, the Eagle Picher Trust conducted a Building Cleanout in 2008 which included decontamination of three site buildings, the razing of one building and the disposal of sulfuric acid, PCB equipment and PCB-contaminated materials. A 2009 Supplemental Extent of Contamination Investigation established that most outparcel lead contamination was contributed by non-site related sources (i.e., regional mining activities). During this investigation it was also determined that a majority of the mercury-contaminated materials encountered during the original investigation were not characteristically hazardous, and that sediments in the Spring Branch of Short Creek exceeded PECs for arsenic, cadmium, chromium, lead, and zinc. Analysis of surface water samples collected by KDHE in 2009 indicated that mercury was not present in Short Creek at concentrations above laboratory detection limits. Additional site characterization was conducted in 2010 to

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determine the thickness and volume of waste piles west of the smelter plant area. Data collected were used to estimate that approximately 275,000 cubic yards of contaminated material at the site exceed applicable threshold levels.

An Evaluation of Remedial Alternatives was conducted in 2011 to identify the most cost-effective way to address contamination at the site. The proposed remedy, on-site consolidation and encapsulation of waste, contaminated soil and sediment, was further refined after meeting with stakeholders to four placement options: an 11.6 acre encapsulation cell on the west side of the smelter plant area, a 7.6 acre encapsulation cell on the east side of the smelter plant area, or two configurations with encapsulation cells on both the west and east sides of the former smelter plant area, one with a 5.4 acre west and a 6.7 east encapsulation cell and one with a 5.6 acre west and 6.7 acre east encapsulation cell.

**REMEDIAL PLAN:**

The primary Contaminants of Concern (COCs) at the site are lead, arsenic and mercury found in smelter waste, soils and stream sediments. Remedial Action Objectives (RAOs) include: 1) preventing human exposure through direct contact with and/or ingestion of contaminated soil and smelter waste with COCs in excess of KDHE's Tier 2 Levels for non-residential use; 2) precluding adverse impact from contaminated soil, sediment and smelter waste to aquatic life and other ecological receptors; and 3) preventing migration of soil, sediments and smelter waste that contain COCs in excess of applicable standards that could result in greater environmental degradation of surface water, sediment, soils and the adjacent environment.

With the input of stakeholders and in the interest of promoting redevelopment of the western area of the site, the corrective action selected to achieve site RAOs includes excavation, consolidation and capping of contaminated soil and smelter waste in excess of non-residential Tier 2 Levels, as well as contaminated sediments in excess of the mercury PEC, in a single consolidation cell east of the former smelter plant area as shown on Figures 2 and 3. The consolidation cell will be located within the 68-acre area of concern and outside of the 100-year flood plain of Short Creek as required by the Bankruptcy Settlement Agreement (June 30, 2006). Areas within the fenced former smelter plant area will be covered with a six-inch compacted gravel layer. An Environmental Use Control (EUC) will be placed on the site to preclude the use of the property for residential use and to prohibit future intrusive activities that may damage the cap, among other restrictions. A long-term Operations and Maintenance plan will be developed which will include routine inspections, and repairs will be conducted as needed to ensure long-term effectiveness of the remedy. Total cost of this remedy is estimated to be \$4,993,000, which is within the current funding available in the bankruptcy trust.

Specific requirements of the remedial plan include the following:

- (1) Approximately 275,000 cubic yards of contaminated soil, smelter waste and sediments will be consolidated, graded, compacted and covered with an engineer designed cap consisting of geomembrane liner, geosynthetic drainage layer, and a minimum two-foot thick soil layer. The encapsulation cell will be

seeded and mulched to create a vegetative cap. Fencing will be installed around the cell to prevent unauthorized access and to protect the structural integrity of the cell.

- (2) Areas within the fenced smelter plant area will be covered in place with a minimum of six inches of clean compacted gravel.
- (3) Sediments below the high-water mark of Short Creek that contain mercury at concentrations above its PEC will be excavated to a maximum depth of one foot and placed into the consolidation cell. In areas of Short Creek below the low-water mark, excavated sediment will be separated and clean materials returned to the stream. Three thousand linear feet of stabilization material will be installed along the creek bank to prevent erosion and re-establish vegetation.
- (4) Two mercury settling ponds will be excavated to the water table. Contaminated material located below the water table will not be removed but will be covered with earth-stabilizing materials and soil and revegetated to prevent direct contact and future erosion.
- (5) Mercury-contaminated waste materials and piles located on Outparcels A and E will be excavated and placed within the consolidation cell.
- (6) All excavated material will be placed in the consolidation cell unless material containing mercury has been determined to be characteristically hazardous. All hazardous material will be disposed of off-site at a licensed hazardous waste disposal facility.
- (7) 26.1 acres of excavated area will be regraded, direct-seeded and mulched.
- (8) Additional characterization of surface water quality will be conducted following construction of the consolidation cell.
- (9) A EUC and Long Term Care Agreement (LTCA) will be established to restrict future use of the site where there is residual contamination above residential Tier 2 levels. An application to the EUC program must be submitted within 90 days of the date of the Final Agency Decision Statement.
- (10) A Soil Waste Management Plan (SWMP) will be developed which will direct the handling of potentially contaminated soil or waste encountered during future use or development of the site. The SWMP will be part of the EUC and LTCA.
- (11) A long-term Operations and Maintenance (O&M) plan will be developed which will include mowing and routine inspections of the consolidation cell, with repairs conducted as needed to ensure long-term effectiveness of the remedy.

**RECOMMENDATION:** On the basis of information available in the Administrative Record and summarized above, KDHE recommends implementation of the proposed remedial plan.

**COMMUNITY**

**INVOLVEMENT:** Public notice of the availability of the Draft Agency Decision Statement (ADS) was published in the *Galena Sentinel-Times* on August 8, 2012, and the Draft ADS was available for review at Galena City Hall from August 8 through August 23, 2012 during the 15-day comment period held to solicit written comments from the public. KDHE presented information regarding the proposed cleanup during the August 13, 2012 Galena City Council meeting, and KDHE personnel were available immediately following the presentation to answer questions. KDHE also established a webpage dedicated to the Eagle Picher site which made available the Draft ADS and other site documents. No comments were received during the comment period.

**TABLES:** Table 1 – Contaminant Concentrations in Soil  
Table 2 – Contaminant Concentrations in Sediment  
Table 3 – Contaminant Concentrations in Surface Water

**FIGURES:** Figure 1 – Site Location Map  
Figure 2 – Excavation Plan Map  
Figure 3 – Consolidation Cell Location Map

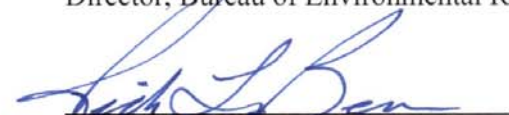
**FINAL AGENCY APPROVAL:**



Gary Blackburn, LG  
Director, Bureau of Environmental Remediation

10/1/12

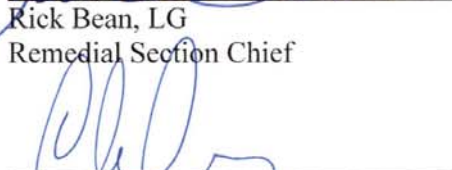
Date



Rick Bean, LG  
Remedial Section Chief

9/24/12

Date



Chris Carey, LG  
Site Restoration Unit Manager

9/17/12

Date



Maura O'Halloran, LG  
Site Project Manager

9/17/12

Date

**TABLE 1: CONTAMINANT CONCENTRATIONS IN SOIL**

Contaminant of Concern	Residential Tier 2 Level Soil Pathway (mg/kg)*	Non-Residential Tier 2 Level Soil Pathway (mg/kg)*	Maximum Concentration Detected (mg/kg)
Arsenic	11.3	38	1,520
Cadmium	39	965	7,180
Lead	400	1,000	58,800
Mercury	2	20	9,050
Zinc	23,500	613,000	193,000

\*KDHE's Risk Based Standards for Kansas (RSK) Manual, October, 2010.

Bold Font indicates concentration exceeds specified threshold level, laboratory analysis only  
mg/kg = milligrams per kilogram

**TABLE 2: CONTAMINANT CONCENTRATIONS IN SEDIMENT**

Contaminant of Concern	Tri-County PECs (mg/kg)	Maximum Concentration Detected (mg/kg)
Arsenic	33	77.1
Cadmium	4.98	156
Chromium	111	115
Lead	150	66,400
Mercury	1.0	18.5
Zinc	2,083	32,400

Bold Font indicates concentration exceeds specified threshold level, laboratory analysis only  
mg/kg = milligrams per kilogram

PEC = Probable Effects Concentration

**TABLE 3: CONTAMINANT CONCENTRATIONS IN SURFACE WATER**

Contaminant of Concern	Acute Aquatic Life Criteria (µg/L)	Chronic Aquatic Life Criteria (µg/L)	Maximum Concentration Detected (µg/L)
Arsenic	340	150	<10
Cadmium	3.6	0.4	49.3
Chromium	NA	40	<5
Lead	158.6	6.1	10.3
Mercury	1.4	0.77	<0.2
Zinc	185	185	3,690

Bold Font indicates concentration exceeds specified threshold level

µg/L = micrograms per liter

NA = criterion not available







#### NOTES:

1. SUPPLY & INSTALL APPROX. 4,000 LF OF SILT FENCE ALONG THE BANK OF THE STREAM.
2. SUPPLY & INSTALL GEOTEXTILE & GRAVEL FOR THE TEMPORARY STREAM CROSSING.
3. SUPPLY & INSTALL 6-INCH GRAVEL REMEDIATION COVER WITHIN FENCED SMELTER AREA.
4. EXCAVATE AND LONG-HAUL 157,000 CY OF CONTAMINATED SOIL (AREAS A, B, C, D & E) AND MOVE TO THE EASTSIDE ENCAPSULATION AREA.
5. EXCAVATE AND SHORT-HAUL 32,900 CY OF CONTAMINATED SOIL (AREA F) AND MOVE TO THE EASTSIDE ENCAPSULATION AREA.
6. REMOVE MERCURY CONTAMINATION FROM STREAM LOCATIONS.
7. SUPPLY & INSTALL 372,400 SF (7.6 AC) OF 40 MIL HDPE GEOMEMBRANE & DOUBLE-SIDED COMPOSITE OVER THE EASTSIDE ENCAPSULATION AREA.
8. SUPPLY & INSTALL 300 LF x 15 FT OF RIPRAP FOR DOWNCHUTES ON THE EASTSIDE ENCAPSULATION AREA.
9. SUPPLY 31,750 CY OF OFF-SITE SOIL.
10. PLACE 27,600 CY OF OFF-SITE SOIL ON THE EASTSIDE ENCAPSULATION AREA.
11. PLACE 4,150 CY OF OFF-SITE SOIL AS ENCAPSULATION ON MERCURY PONDS.

#### LEGEND

---	EXISTING PROPERTY LINE
- - -	EXISTING FEMA 100-YR FLOOD PLAIN
---	EXISTING INDEX CONTOUR
---	EXISTING INTERMEDIATE CONTOUR
---	EXISTING EDGE OF CONCRETE
---	EXISTING PAVED ROADWAY
---	EXISTING UNPAVED DRIVEWAY
---	EXISTING PAVED DRIVEWAY
---	EXISTING FENCE
---	EXISTING GUIDERAIL
---	PROPOSED EXCAVATION INDEX CONTOUR
---	PROPOSED EXCAVATION INTERMEDIATE CONTOUR
---	PROPOSED EXCAVATION LIMIT
---	PROPOSED WASTE INDEX CONTOUR
---	PROPOSED WASTE INTERMEDIATE CONTOUR

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SCALE IN FEET



EAGLE PITCHER CUSTODIAL TRUST  
CLEANUP ACTION WORK PLAN OPTIONS  
FORMER EAGLE PITCHER SMELTER SITE  
GALENA, KANSAS

**Civil & Environmental Consultants, Inc.**  
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412-429-2324 - 800-365-2324

#### REFERENCE:

EXISTING TOPOGRAPHY PREPARED BY TRI-STATE ENGINEERING, INC.,  
1102 W. 9TH STREET, JOPLIN, MO 64801, PHONE: (417) 781-0643.  
DATE OF PHOTOGRAPHY: 12-14-2006, CONTOUR INTERVAL: 1', SCALE: 1"=50'

OPTION B  
EASTSIDE ENCAPSULATION AREA

APPROVED BY: **AS SHOWN**  
PROJECT NO. **081825**  
DRAWING NO. **3**